

In response, Applicants respectfully submit that the present claims recite a low temperature autoignition composition consisting essentially of an intimate mixture of an oxidizer composition and a powdered metal fuel, where the oxidizer composition comprises silver nitrate or a comelt or mixture of silver nitrate and at least one additional component selected from the Markush group of oxidizers recited in the claims. One of ordinary skill in the art would recognize that the recitation in the claims of an oxidizer composition comprising the claimed oxidizers is constrained by the use of “consisting essentially of” with regard to the components of the claimed low temperature autoignition composition. It would be understood by one of ordinary skill in the art that the use of the transition “comprising” with regard to the oxidizer composition does not expand the scope of the claim, which is limited by the recitation of the transition “consisting essentially of” to the specified materials and any other components that do not materially affect the basic and novel characteristics of the presently claimed invention. See M.P.E.P §2111.03.

It should also be noted that the Examiner has allowed at least two applications with claims directed to compositions or methods consisting essentially of a number of components or steps, and dependent claims that further comprise additional components or steps. For example, see U.S. Patent Nos. 6,059,906 and 5,734,124 to Fleming et al. and Bruenner et al., respectively. Therefore, Applicants submit that the allegedly conflicting recitations of “consisting essentially of” and “comprising” in the claims is not the error the Office Action alleges it to be.

With regard to the recitations of “sufficiently intimately mixed” and “sufficient degree of contact” in the claims, Applicants respectfully submit that one of ordinary skill in the art would understand those terms in light of the specification. The

present claims require an intimate mixture of the oxidizer composition and powdered metal fuel, where the metal fuel and oxidizer are sufficiently intimately mixed to ensure a sufficient degree of contact between the oxidizer and the metal fuel in the presently claimed composition to provide an autoignition composition having an autoignition temperature of no more than about 232°C. In particular, at page 13, line 13, to page 14, line 4, the specification clearly discusses the particle sizes required to obtain the desired ingredient intimacy and mix homogeneity. One of ordinary skill in the art would understand the recitation of "intimate mix", "sufficiently intimately mixed", and "sufficient degree of contact" in light of the specification, and, thus, the claims are not indefinite.

In this regard, the Office Action states that Scheffe et al. disclose that solid propellant compositions can be used as autoignition compositions, and, thus, the compositions disclosed by Sammons could also be used as autoignition compositions. However, the compositions disclosed by Scheffe et al. and Sammons are not of the type presently claimed. As discussed in the Rule 132 Declaration submitted with the Preliminary Amendment dated May 19, 2000, the presently claimed autoignition materials require intimate mixing of the claimed metal fuels and oxidizer composition to have the claimed autoignition temperature of no more than about 232°C. That is, the claims are not directed to any composition comprising an oxidizer and a fuel that will autoignite at some elevated temperature, as alleged by the Office Action, but, instead, are directed to compositions having all of the elements recited in the present claims.

With regard to the content of the oxidizer composition, the Office Action states that the claims are not clear as to what is required, what is permissible, and what is an alternative to silver nitrate in the oxidizer composition. Applicants respectfully submit

that the present claims recite that the oxidizer composition comprises silver nitrate or a comelt or mixture comprising silver nitrate and at least one additional component selected from the group consisting of an alkali metal nitrate, an alkaline earth metal nitrate, a complex salt nitrate, a dried, hydrated nitrate, an alkali metal chlorate, an alkali metal perchlorate, an alkaline earth metal chlorate, an alkaline earth metal perchlorate, ammonium perchlorate, sodium nitrite, potassium nitrite, silver nitrite, a complex salt nitrite, a solid organic nitrate, and a solid organic nitrite. Therefore, one of ordinary skill in the art would understand that silver nitrate is required in the claimed compositions, that the oxidizers recited in the Markush group are permissible, and that there are no alternatives to silver nitrate.

With regard to the stoichiometric requirement in the claims, the Office Action states that it “is not stated with sufficient particularity with regard to what the stoichiometry is determined.” Moreover, it is alleged that it is not clear whether the recitation of a stoichiometric amount ignores all components except for the metal fuel and oxidizer. Applicants respectfully submit that, with regard to the stoichiometric amount, the claims clearly recite that the metal fuel is present in an amount at least sufficient to provide a substantially stoichiometric mixture of metal fuel and oxidizer. One of ordinary skill in the art would understand that the stoichiometric relationship is between the metal fuel and the oxidizer only, and that the other components in the composition are ignored with regard to the stoichiometry.

Therefore, the claims particularly point out and distinctly claim the subject matter that Applicants regard as the invention, and, thus, are not indefinite. Accordingly, the claims meet the requirements of 35 U.S.C. §112, second paragraph, and Applicants

respectfully request that the Examiner withdraw the rejection of the claims under 35 U.S.C. §112.

Claims 1, 13 to 18, and 25 to 32 were rejected under 35 U.S.C. §112, first paragraph, for the reasons set forth on pages 6 and 7 of the Office Action. In particular, the Office Action states that the specification fails to provide a basis for the terms “sufficiently intimately mixed” and “sufficient degree of contact” in the claims.

In response, Applicants respectfully submit that the specification, at page 13, line 13, to page 14, line 4, clearly discusses the particle sizes required to obtain ingredient intimacy and mix homogeneity. One of ordinary skill in the art would understand the recitation of “intimate mix”, “sufficiently intimately mixed”, and “sufficient degree of contact” in light of the specification, and, thus, the subject matter of the claims is described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. Accordingly, the claims and specification meet the requirements of 37 C.F.R. §112, first paragraph.

With regard to the examples, the Office Action alleges that the specific examples in the Office Action all include molybdenum. However, at page 10, the specification recites four (4) such specific examples using magnesium. Also, at page 17, Example 2 provides a composition using zinc, and, at page 18, Example 5 provides a composition using magnesium. Moreover, Applicants are not required to exemplify all embodiments of their invention.

Therefore, as the subject matter of the claims is described in the specification in such a way as to reasonably convey to one skilled in the art that the

inventors, at the time the application was filed, had possession of the claimed invention, the present claims and specification meet the requirements of 37 C.F.R. §112, first paragraph. Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claims 1, 13 to 18, and 25 to 32 under 37 C.F.R. §112, first paragraph.

At pages 7 and 8 the Office Action states that the claims were examined “as being of a broad ‘comprising’ scope.” However, as discussed above, the claims recite a low temperature autoignition composition for safely initiating combustion of a main pyrotechnic charge in a gas generator or pyrotechnic device exposed to flame or a high temperature environment, consisting essentially of an intimate mixture of an oxidizer composition and a powdered metal fuel. One of ordinary skill in the art would recognize that the recitation of an oxidizer composition comprising the recited oxidizers is constrained by the use of “consisting essentially of” with regard to the components of the claimed low temperature autoignition composition, and, thus the claims should be examined using this narrower scope. Moreover, as discussed above, the claims are not indefinite, and the subject matter of the claims is described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. Accordingly, the claims and specification meet the requirements of 37 C.F.R. §112.

Moreover, the mere fact that prior art references disclose or suggest other compositions that may have a low autoignition temperature is not relevant to the patentability of the present claims where the cited references do not disclose or at least suggest the autoignition compositions of the presently claimed invention. That is, to be relevant to the patentability of the present claims, the prior art references must disclose or

at least suggest autoignition compositions having each of the claimed elements of the presently claimed invention, and provide motivation for those of ordinary skill in the art to obtain the presently claimed compositions. As discussed below, the prior art references cited in the Office Action do not disclose or even suggest the presently claimed compositions, and fail to provide any motivation to one of ordinary skill in the art to obtain the presently claimed compositions.

Claims 1, 13 to 18, and 26 to 32 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Sammons et al. ("Sammons") in view of Sidebottom, Garner et al. ("Garner"), Healy, and Ellern et al. ("Ellern") for the reasons set forth on page 8 of the Office Action.

In response, Applicants submit that the presently claimed invention is directed to a low temperature autoignition composition for safely initiating combustion of a main pyrotechnic charge in a gas generator or pyrotechnic device exposed to flame or a high temperature environment. Claim 1 recites that the autoignition composition consists essentially of an intimate mixture of an oxidizer composition and a powdered metal fuel, where the oxidizer composition comprises silver nitrate or a comelt or mixture comprising silver nitrate and at least one additional component selected from the group consisting of an alkali metal nitrate, an alkaline earth metal nitrate, a complex salt nitrate, a dried, hydrated nitrate, an alkali metal chlorate, an alkali metal perchlorate, an alkaline earth metal chlorate, an alkaline earth metal perchlorate, ammonium perchlorate, sodium nitrite, potassium nitrite, silver nitrite, a complex salt nitrite, a solid organic nitrate, and a solid organic nitrite, and the metal fuel is selected from the group consisting of molybdenum, calcium, strontium, barium, titanium, zirconium, vanadium, niobium, tantalum, chromium,

tungsten, manganese, iron, cobalt, nickel, copper, zinc, cadmium, tin, antimony, bismuth, aluminum, silicon, and mixtures thereof. The oxidizer composition has at least one of a crystalline phase transition, a melting point, a eutectic point, or peritectic point at a temperature of no more than about 250°C. The metal fuel is present in an amount at least sufficient to provide a substantially stoichiometric mixture of metal fuel and oxidizer, and the metal fuel and oxidizer are sufficiently intimately mixed to ensure a sufficient degree of contact in the composition between the oxidizer and the metal fuel to provide an autoignition composition having an autoignition temperature of no more than about 232°C.

As recited in claim 26, the low temperature autoignition composition comprises a mixture of an oxidizer composition and a powdered metal fuel, wherein the oxidizer composition comprises a mixture or a comelt comprising silver nitrate and at least one additional component selected from the group recited in claim 1. Again, the metal fuel is present in an amount at least sufficient to provide a substantially stoichiometric mixture of metal fuel and oxidizer, and the metal fuel and oxidizer are sufficiently intimately mixed to ensure a sufficient degree of contact in the composition between the oxidizer and the metal fuel to provide an autoignition composition having an autoignition temperature of no more than about 232°C. Useful metal fuels include, but are not limited to molybdenum, magnesium, calcium, strontium, barium, titanium, zirconium, vanadium, niobium, tantalum, chromium, tungsten, manganese, iron, cobalt, nickel, copper, zinc, cadmium, tin, antimony, bismuth, aluminum, and silicon.

As discussed in the Declaration of Christopher P. Ludwig, submitted with the Preliminary Amendment dated May 19, 2000, the intimate mixing of the fuel and oxidizer is required in the present invention to provide the contact between the claimed

oxidizer and metal fuel necessary to obtain proper autoignition of the presently claimed compositions. In particular, the Declaration states at paragraph 5, "The intimate mixing of the fuel and oxidizer is required in the present invention to provide the contact between the oxidizer and the metal fuel that is necessary to obtain proper autoignition, as the reaction or burning rate and ease of autoignition of the compositions of the invention increase as mix intimacy and homogeneity increases." (Emphasis added).

In contrast, Sammons discloses composite propellants, comprising an oxidizer and a metal fuel dispersed within a binder matrix. Column 1, lines 17 to 30 and 69 to 71, column 2, lines 1 to 4, column 5, lines 53 to 66, column 6, lines 13 to 44, and the examples. The binder is based upon a linear polymethylenenitramine that is polymerized after being mixed with the fuel and oxidizer. Column 2, line 1, to column 4, line 14, and the examples. Therefore, Sammons does not disclose or suggest a low temperature autoignition composition consisting essentially of an intimate mixture of an oxidizer composition comprising silver nitrate or a comelt or mixture comprising silver nitrate and at least one of the other oxidizers recited in the claims and a powdered metal fuel, as recited in the claims. Instead, as discussed in paragraph 7 of the Rule 132 Declaration, the dispersion disclosed by Sammons prevents the intimate mixture of oxidizer and fuel. This lack of intimate mixing due to the presence of the binder materially affects the mixing of the oxidizer and the fuel in the compositions disclosed by Sammons, and, thus, places the compositions disclosed by Sammons outside the scope of the present claims. Therefore, Sammons does not disclose or suggest the presently claimed invention.

Moreover, the only oxidizer disclosed by Sammons is ammonium perchlorate, which decomposes at about 380°C, a temperature that is significantly higher

than the presently claimed 250°C. This further distinguishes the composite propellants disclosed by Sammons from the low temperature autoignition materials of the invention.

The other cited references do nothing to overcome the deficiencies of Sammons. In particular, none of the other cited references disclose or even suggest an intimate mixture of an oxidizer composition and a metal fuel. Therefore, even if the teachings of the secondary references were combined with those of Sammons, the combination would not provide an intimate mixture of an oxidizer composition and a metal fuel as required by the claims to the low temperature autoignition composition of the invention.

Sidebottom teaches gas generating compositions comprising an alkali or alkaline earth metal azide, an oxidizing compound, and an oxide of silicon, aluminum, titanium, tin, or zinc with or without silicon, aluminum, titanium, tin, or zinc metal. Column 1, lines 44 to 49. Examples include a composition containing sodium azide, silicon, and potassium perchlorate in molar proportions of 8:4:3 and a composition containing sodium azide, aluminum, and potassium chlorate in molar proportions of 2:2:1. Column 3, lines 61 and 62, column 4, lines 45 and 46. Therefore, as with compositions comprising a binder, the azide separates the particles of oxidizer and metal, and prevents the formation of an intimate mixture of an oxidizer composition and a powdered metal fuel. Sidebottom thus does not disclose or suggest the presently claimed intimate mixture of a metal fuel and oxidizer, where the oxidizer composition comprises silver nitrate or a comelt or mixture comprising silver nitrate and at least one of the other oxidizers recited in the claims, whether taken alone or in combination with Sammons.

Moreover, the only oxidizers disclosed by Sidebottom are potassium perchlorate and potassium chlorate, which have melting points of 400°C and 368°C, respectively. These melting points are significantly higher than those required in the presently claimed invention, and, thus, cannot provide the presently claimed autoignition temperature of no more than about 232°C.

Garner '253 teaches the use of starch as a fuel/binder in pyrotechnic compositions, such as those used as gas generants in inflatable safety restraints. Garner does not disclose or suggest an intimate mixture of an oxidizer composition and a metal fuel. Instead, Garner teaches a pyrotechnic composition in which the oxidizer and fuel are separated by a binder, thus, preventing the required intimate mixing.

Healy teaches a melt-in-fuel emulsion comprising a melt of ammonium nitrate as the discontinuous phase and a fuel as the continuous phase. Column 1, lines 9 and 10. The fuel is a water-insoluble non-self-explosive fuel selected from the group consisting of hydrocarbons, halogenated hydrocarbons, and mixtures thereof. Column 1, line 66, to column 2, line 9. Therefore, as Healy discloses a completely different fuel than that recited in the claims to the present invention, Healy also fails to disclose or even suggest the presently claimed intimate mixtures of oxidizers and metal fuels.

As discussed in the Rule 132 Declaration in paragraph 9, the Final Office Action, incorporated by reference in the present Office Action at page 8, states that Ellern, at pages 296 to 300, teaches, "the melting point and decomposition temperature of silver nitrate, and discusses the reaction of solid fuels with solid oxidizers as related to melting temperature. This would seem to suggest the relatively low decomposition or autoignition (spontaneous ignition) temperature of such compositions." However, the teachings of

Ellern must be taken in context. That is Ellern specifically states, in the sentence bridging pages 296 and 297, that there is a scarcity of systematic data regarding the initiation temperature of fuel-oxidizer mixtures that restricts general statements. Although Ellern teaches that the melting point of silver nitrate is 214°C, in Tables 29 and 30, Ellern only discloses metal/oxidizer binary mixtures and ignition mixtures having initiation temperatures of at least 300°C. Such an autoignition temperature of 300° is, of course, outside the scope of the present claims, and, thus, does nothing to disclose or even suggest the presently claimed invention. Moreover, as with the other secondary references, substituting the silver nitrate oxidizer disclosed by Ellern for the oxidizer disclosed by Sammons et al. would not provide the present invention, as it does not provide the intimate mixture of the oxidizer and fuel of the presently claimed invention.

As discussed above, even if the teachings of Sammons were combined with the teachings of any of the other cited references, the combination would not provide the presently claimed intimate mixture of the oxidizer composition and powdered metal fuel of the present invention. Instead, the combination would provide a propellant in which the oxidizer and fuel are dispersed throughout a binder matrix, thereby preventing the intimate mixing of the oxidizer and metal fuel. As a result, the cited references provide no motivation to one of ordinary skill in the art to obtain the presently claimed invention.

Therefore, Sammons, Sidebottom, Garner '253, Healy, and Ellern, whether taken alone or in combination do not disclose or suggest the presently claimed invention, and fail to provide any motivation to one of ordinary skill in the art to obtain the presently claimed invention. Accordingly, the claims are not obvious over any or all of those

references, and it is respectfully requested that the Examiner withdraw the rejection of claims 1, 13 to 18, and 26 to 32 under 35 U.S.C. §103(a).

Claims 1, 13 to 18, and 26 to 32 were rejected under 35 U.S.C. §103(a) as being unpatentable over Halliday et al. ("Halliday") in view of Tepper and Ellerm for the reasons set forth on page 8 of the Office Action.

In response, as discussed in paragraph 10 of the Rule 132 Declaration, Halliday teaches explosive "water-in-fuel" and "melt-in-fuel" emulsions. The disclosed emulsions comprise an oxidizer as the discontinuous phase, a fuel as the continuous phase, and a density reducing agent. Column 1, lines 17 to 33. The fuel should be substantially solid at ambient temperature, but should also have a softening point above ambient temperature. Column 1, lines 41 to 49. Typical fuels include waxes, oils, liquid paraffin, xylene, toluene, petroleum, and dinitrotoluene. Column 1, lines 57 to 59, and column 3, lines 11 to 18. The softening point of the fuel should be above 35°, so that the fuel has a low viscosity at 85° to 95°C. Column 1, lines 59 to 62. Clearly, the fuels disclosed by Halliday are not metals, and, thus, are outside the scope of the present claims.

Although Halliday does disclose that a solid fuel, such as atomized aluminum, may be blended together with the density reducing agent, column 1, lines 37 to 40, Halliday fails to disclose or suggest the presently claimed intimate mixture of oxidizer composition and metal fuel. As Halliday teaches that the metal is dispersed throughout the continuous phase of the fuel with the density reducing agent, the metal is substantially separated from the oxidizer by the fuel, preventing intimate mixing of the metal fuel and oxidizer, as presently claimed.

Moreover, Halliday teaches that the disclosed explosive emulsions typically comprise 75 to 95 weight percent oxidizer and 3.2 to 6.5 weight percent fuel. Therefore, the amount of metal fuel is significantly less than an amount at least sufficient to provide a stoichiometric mixture of metal fuel and oxidizer, further distinguishing the presently claimed invention from the explosive emulsions disclosed by Halliday.

Tepper does nothing to overcome the deficiencies of Halliday. Tepper teaches castable pyrotechnic compositions comprising powdered metal dispersed in a low-melting metal nitrate or metal chlorate oxidizer. Column 1, lines 1 to 22. The powdered metal is dispersed in a melt of the oxidizer to form a slurry during the casting process, and, thus, the disclosed castable compositions must have high temperature stability, or they would autoignite during the casting process.

Tepper does not disclose an autoignition composition having an autoignition temperature of no more than about 232°C. The salt mixtures disclosed by Tepper melt below 250°, column 1, lines 56 and 57, and, as it must be assumed that the compositions do not autoignite during the casting process, the disclosed compositions do not have an autoignition temperature of no more than 232°C. Moreover, even if the teachings of Tepper and Halliday were combined, such that the metal fuels of Tepper were used in the emulsions of Halliday, the combination would not provide the presently claimed invention. Instead, one would obtain an explosive "water-in-fuel" or "melt-in-fuel" emulsion, comprising the discontinuous phase, a fuel as the continuous phase, a density reducing agent, and an optional metal fuel dispersed throughout the continuous phase of the fuel with the density reducing agent, so that the metal is substantially separated from the oxidizer by the fuel, preventing intimate mixing of the fuel and oxidizer, as presently

claimed. Moreover, one of ordinary skill in the art, following the teaching of Halliday and Tepper, would use an amount of metal fuel significantly less than an amount at least sufficient to provide a stoichiometric mixture of metal fuel and oxidizer, as presently claimed.

In Table 19, as stated in the Final Office Action, incorporated by reference in the present Office Action, Ellern teaches the melting points and eutectics of various nitrates and mixtures of various nitrates. The melting points and eutectics of the nitrates and mixtures ranges from 52° to 561°C. However, Ellern does not disclose or suggest that the nitrates should be intimately mixed with a powdered metal fuel to form a low temperature autoignition composition having an autoignition temperature of no more than about 232°C.

Moreover, if the teaching of Ellern was combined with that of Halliday and Tepper, the combination would not provide the presently claimed invention. Instead, the combination would provide explosive "water-in-fuel" and "melt-in-fuel" emulsions in which the optional metal, if present, was dispersed through the fuel phase, making the intimate mixing of the metal fuel and oxidizer impossible. Moreover, one of ordinary skill in the art, following the teaching of Halliday and Ellern, would use an amount of metal fuel significantly less than an amount at least sufficient to provide a stoichiometric mixture of metal fuel and oxidizer, as presently claimed.

Therefore, as Halliday, Tepper, and Ellern, whether taken alone or in combination, do not disclose or suggest the presently claimed intimate mixture of oxidizer and metal fuel, where the metal fuel is present in an amount at least sufficient to provide a substantially stoichiometric mixture of metal fuel and oxidizer, the present claims are not

obvious. Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claims 1, 13 to 18, and 26 to 32 under 35 U.S.C. §103(a).

Claims 1, 13 to 18, and 26 to 32 were rejected under 35 U.S.C. §103(a) as being unpatentable over Poole et al. ("Poole") '380 in view of Ferrando et al. ("Ferrando"), Katzakian et al. ("Katzakian"), Halliday et al. ("Halliday"), and Yabsley et al. ("Yabsley") for the reasons set forth on page 8 of the Office Action.

In response, as discussed in Mr. Ludwig's Rule 132 Declaration in paragraph 15, Poole discloses ignition compositions for inflator gas generators that comprise HNTO and an oxidizer, where HNTO is the hydrazine (H_2NNH_2) salt of 3-nitro-1,2,4-triazole-5-one, otherwise known as nitrotriazolone ("NTO"). Optionally, the disclosed compositions may also include a metal additive, as a booster ignition material. Poole fails to disclose or suggest that the metal additive should be present in an amount at least sufficient to form a stoichiometric mixture of metal and oxidizer, as is required in the present claims. The only composition exemplified by Poole that includes a metal additive contains 78 percent HNTO and 18 percent sodium nitrite, but only 2 percent boron, an amount of boron significantly less than the amount required for a stoichiometric mixture of boron and oxidizer. Therefore, the compositions disclosed by Poole are outside the scope of the presently claimed low temperature autoignition compositions, and one of ordinary skill in the art following the teaching of Poole would not be motivated to obtain autoignition compositions in which metal fuel is present in an amount at least sufficient to provide a substantially stoichiometric mixture of metal fuel and oxidizer.

The other cited references do nothing to overcome the deficiencies of Poole. Substituting the oxidizers taught in the secondary references for the oxidizer disclosed by

Poole would not provide the presently claimed invention, as the resulting composition would not contain an amount of metal at least sufficient to form a stoichiometric mixture of metal fuel and oxidizer.

A case in point is Yabsley, which discloses oxidizers, such as ammonium nitrate and silver nitrate, for use in melt-in-fuel explosives that comprise a continuous organic fuel phase and a discontinuous oxidizer phase. Column 1, lines 46 to 53. However, using the oxidizers disclosed by Yabsley in the compositions disclosed by Poole would not provide the presently claimed invention. Instead, one of ordinary skill in the art following the teachings of Poole in view of Yabsley would obtain a composition containing HNTO and an oxidizer and, perhaps, an amount of metal significantly less than an amount at least sufficient to provide a stoichiometric mixture of metal fuel and oxidizer, as presently claimed.

Ferrando discloses silver-coated boron carbide particles for reinforcing certain metal alloy matrices. Column 2, lines 57 to 60, and column 3, lines 1 to 5. The pyrophoric reaction cited in the Final Office Action, incorporated by reference into the present Office Action, is between silver nitrate and boron carbide particles, and occurs during the coating process. However, boron carbide, B_4C , is not HNTO or a metal, and, thus, Ferrando fails to provide any motivation to one of ordinary skill in the art to use silver nitrate as an oxidizer in the compositions disclosed by Poole, or to obtain the presently claimed autoignition compositions. Moreover, even if one of ordinary skill in the art did substitute silver nitrate for the oxidizers disclosed by Poole, it would not provide the presently claimed invention. Instead, it would provide a composition containing HNTO and silver nitrate and, perhaps, an amount of metal significantly less than an amount at

least sufficient to provide a stoichiometric mixture of metal fuel and oxidizer, as presently claimed.

Katzakian discloses gas generator propellants that contain a polymeric binder blended with an ammonium nitrate based eutectic. Column 1, lines 53 to 67, and the Abstract. However, Katzakian does not disclose or suggest an autoignition composition comprising an intimate mixture of a metal fuel and an oxidizer composition. Moreover, even if the teachings of Katzakian and Poole were combined, this combination would not provide the presently claimed invention. Instead, it would provide a composition containing HNTO and ammonium nitrate and, perhaps, an amount of metal significantly less than an amount at least sufficient to provide a stoichiometric mixture of metal fuel and oxidizer, as presently claimed.

As previously discussed, Halliday discloses explosive "water-in-fuel" and "melt-in-fuel" emulsions that may contain ammonium nitrate and silver nitrate. However, as discussed above and in the Rule 132 Declaration, Halliday fails to disclose or suggest an autoignition composition comprising an intimate mixture of a metal fuel and an oxidizer composition. Moreover, even if the teachings of Halliday and Poole were combined, the combination would not provide the presently claimed invention. Instead, it would provide a composition containing HNTO and ammonium nitrate and/or silver nitrate and, perhaps, an amount of metal significantly less than an amount at least sufficient to provide a stoichiometric mixture of metal fuel and oxidizer, as presently claimed.

Therefore, as Poole, Ferrando, Katzakian, Halliday, and Yabsley, whether taken alone or in combination do not disclose or suggest the presently claimed autoignition composition, the present claims are not obvious. Accordingly, it is respectfully requested

that the Examiner withdraw the rejection of claims 1, 13 to 18, and 26 to 32 under 35 U.S.C. §103(a).

Claims 1, 13 to 15, and 26 to 32 were rejected under 35 U.S.C. §103(a) as being unpatentable over Halliday for the reasons set forth on page 5 of the Office Action.

In response, as discussed above and in the Rule 132 Declaration, Applicants submit that Halliday teaches explosive "water-in-fuel" and "melt-in-fuel" emulsions. The disclosed emulsions comprise an oxidizer as the discontinuous phase, a fuel as the continuous phase, and a density reducing agent. Typical fuels include organic materials, such as waxes, oils, liquid paraffin, xylene, toluene, petroleum, and dinitrotoluene. Thus, the fuels disclosed by Halliday are not metals.

Halliday does disclose that a solid fuel, such as atomized aluminum, may be blended together with the density reducing agent. However, Halliday fails to disclose or suggest the presently claimed intimate mixture of oxidizer composition and metal fuel. As Halliday teaches that the metal is dispersed throughout the continuous phase of the fuel with the density reducing agent, the metal is substantially separated from the oxidizer by the fuel, preventing intimate mixing of a metal fuel and oxidizer, as presently claimed.

Moreover, Halliday teaches that the disclosed explosive emulsions typically comprise 75 to 95 weight percent oxidizer and 3.2 to 6.5 weight percent fuel. Therefore, as will be readily understood by one of ordinary skill in the art, the amount of metal fuel used in the compositions disclosed by Halliday is significantly less than an amount at least sufficient to provide a stoichiometric mixture of metal fuel and oxidizer, as presently claimed, further distinguishing the presently claimed invention from the explosive emulsions disclosed by Halliday.

Thus, as Halliday, does not disclose or suggest the presently claimed intimate mixture of oxidizer and metal fuel, the present claims are not obvious. Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claims 1, 13 to 15, and 26 to 32 under 35 U.S.C. §103(a).

Claims 1, 13 to 18, and 26 to 32 were rejected under the judicially created doctrine of obviousness-type double patenting, as being unpatentable over claims 1 to 26 of U.S. Patent No. 5,959,242 for the reasons set forth on page 9 of the Office Action.

In response Applicant submits herewith a Terminal Disclaimer in compliance with 37 C.F.R. §1.321, executed by an attorney of record. As stated in the Office Action, the Terminal Disclaimer overcomes the non-statutory double patenting rejection. Therefore, it is respectfully requested that the Examiner withdraw the rejection of the claim.

Applicants thus submit that the entire application is now in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree with the Applicants' position, then a personal or telephonic interview is respectfully requested to discuss any remaining issues and expedite the eventual allowance of the application.

No fee is believed to be due for this Response. A separate terminal disclaimer fee sheet is filed concurrently herewith. Should any other fees be required, however, please charge such fees to Deposit Account No. 06-1205.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

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